

CLAIMS

What is claimed is:

- 1 1. A heat sink for use with an axial flow fan comprising:
2 a core having a central axis; and
3 a plurality of cooling fins arranged about the core, each fin having a base
4 and a tip, wherein the bases are coupled to the core substantially parallel to the
5 central axis, and wherein the fins are shaped to capture a tangential component of
6 air from the fan.
- 1 2. The heat sink recited in claim 1, wherein an upper portion of each of the fins
2 is bent towards the tangential component.
- 1 3. The heat sink recited in claim 1, wherein the fins are curved towards the
2 tangential component, and wherein an upper portion of each of the fins is bent
3 towards the tangential component.
- 1 4. A heat sink for use with an axial flow fan comprising:
2 a core having a central axis; and
3 a plurality of cooling fins arranged about the core, each fin having a base
4 and a tip, wherein the bases are coupled to the core substantially parallel to the
5 central axis, wherein the fins are shaped to capture a tangential component of air
6 from the fan, and wherein the core is shaped to maximize the number of fins while
7 maintaining a substantially uniform aspect ratio in the fins.
- 1 5. The heat sink recited in claim 4, wherein an upper portion of each of the fins
2 is bent towards the tangential component
- 1 6. The heat sink recited in claim 4, wherein the fins are curved towards the
2 tangential component, and wherein an upper portion of each of the fins is bent
3 towards the tangential component.

1 7. The heat sink recited in claim 4 wherein the core comprises a central cavity
2 to receive a thermal plug formed of a material having a high thermal conductivity.

1 8. An electronic assembly comprising:
2 a substrate;
3 an electronic component mounted on a surface of the substrate;
4 an axial flow fan to move air towards the substrate, the air having an axial
5 component and a tangential component; and
6 a heat sink including
7 a first face in thermal contact with the electronic component;
8 a second face facing the fan;
9 a core having a central axis; and
10 a plurality of cooling fins arranged about the core, each fin having a
11 base and a tip, wherein the bases are coupled to the core substantially
12 parallel to the central axis, and wherein the fins are shaped to capture both
13 components of air.

1 9. The electronic assembly recited in claim 8, wherein an upper portion of each
2 of the fins is bent towards the tangential component.

1 10. The electronic assembly recited in claim 8, wherein the fins are curved
2 towards the tangential component, and wherein an upper portion of each of the fins
3 is bent towards the tangential component.

1 11. The electronic assembly recited in claim 8, wherein the electronic
2 component comprises an integrated circuit (IC).

1 12. The electronic assembly recited in claim 11, wherein the fins are formed of
2 material having a high thermal conductivity, and wherein the aspect ratio of the fins
3 is sufficient to maintain a junction temperature within the IC at or below a
4 predetermined maximum value.

1 13. An electronic system comprising:
2 a circuit board;
3 a processor integrated circuit (IC) mounted on the circuit board;
4 at least one chipset mounted on the circuit board and electrically coupled to
5 the processor IC for operation in conjunction with the processor IC;
6 at least one axial flow fan to move air towards the circuit board, the air
7 having both an axial component and a tangential component; and
8 at least one heat sink including
9 a first face in thermal contact with either the processor IC or the
10 chipset;
11 a second face facing the at least one fan;
12 a core having a central axis; and
13 a plurality of cooling fins arranged about the core, each fin having a
14 base and a tip, wherein the bases are coupled to the core substantially
15 parallel to the central axis, and wherein the fins are shaped to capture both
16 components of air.

1 14. The electronic system recited in claim 13, wherein the core is shaped to
2 maximize the number of fins while maintaining a substantially uniform aspect ratio
3 in the fins.

1 15. The electronic system recited in claim 13, wherein the fins are formed of
2 material having a high thermal conductivity, and wherein the aspect ratio of the fins
3 is sufficient to maintain a junction temperature within the IC at or below a
4 predetermined maximum value.

1 16. The electronic system recited in claim 13, wherein the fins are curved
2 towards the tangential component.

1 17. The electronic system recited in claim 13, wherein an upper portion of each
2 of the fins is bent towards the tangential component.

1 18. The electronic system recited in claim 13, wherein the fins are curved
2 towards the tangential component, and wherein an upper portion of each of the fins
3 is bent towards the tangential component.

1 19. A heat sink comprising:
2 a core having a central axis, and having a surface to thermally contact a heat-
3 generating electrical component;
4 a plurality of cooling fins arranged about the core, each fin having a base
5 and a tip, wherein the bases are coupled to the core substantially parallel to the
6 central axis, and wherein an upper portion of each of the fins is bent in the same
7 relative direction; and
8 a first face having a periphery defined by the fin tips, wherein the first face is
9 to face the component, and wherein the first face comprises inter-fin openings.

1 20. The heat sink recited in claim 19, wherein the inter-fin openings extend from
2 the base to the tip of selected fins.

1 21. The heat sink recited in claim 19, wherein the periphery of the first face has
2 a semi-rectangular shape.

1 22. The heat sink recited in claim 19, wherein the first face substantially
2 matches the shape of the core.

1 23. The heat sink recited in claim 19, wherein the electronic component
2 comprises an integrated circuit (IC).

1 24. The heat sink recited in claim 23, wherein the fins are formed of material
2 having a high thermal conductivity, and wherein the aspect ratio of the fins is
3 sufficient to maintain a junction temperature within the IC at or below a
4 predetermined maximum value.

1 25. A heat sink comprising:
2 a core having a central axis, and having a surface to thermally contact a heat-
3 generating electrical component;
4 a plurality of cooling fins arranged about the core, each fin having a base
5 and a tip, wherein the bases are coupled to the core substantially parallel to the
6 central axis, wherein the fins are curved in the same relative direction, and wherein
7 an upper portion of each of the fins is bent; and
8 a first face having a periphery defined by the fin tips, wherein the first face is
9 to face the component, and wherein the first face comprises inter-fin openings.

1 26. The heat sink recited in claim 25, wherein the inter-fin openings extend from
2 the base to the tip of selected fins.

1 27. The heat sink recited in claim 25, wherein the periphery of the first face has
2 a semi-rectangular shape.

1 28. The heat sink recited in claim 25, wherein the first face substantially
2 matches the shape of the core.

1 29. The heat sink recited in claim 25, wherein the electronic component
2 comprises an integrated circuit (IC).

1 30. The heat sink recited in claim 29, wherein the fins are formed of material
2 having a high thermal conductivity, and wherein the aspect ratio of the fins is
3 sufficient to maintain a junction temperature within the IC at or below a
4 predetermined maximum value.